



GENERAL RADIO COMPANY

WEST CONCORD, MASSACHUSETTS U. S. A. 01781

Mr. T. Nelson
Box 1546
Poughkeepsie, N. Y. 12603

BULK RATE

U. S. POSTAGE

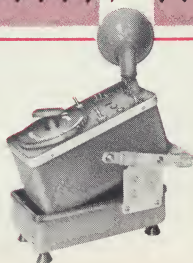
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STROBOTACTICS



LOOK MA! SEE THE CAVITIES!

Ever wonder what happens at the business end of a dentist's drill? Consultants International, of San Antonio, Texas, has and with a Strobotac made some very unusual high-speed photographs. Consultants International is a group engaged in research in the life sciences, and have been evaluating the performance of air-turbine dental handpieces in removing old amalgam fillings from teeth.

These handpieces are equipped with either ball or air bearings and run at no-load speeds as high as 400,000 rpm. Under load, speed reduces to about 290,000 rpm. At these speeds, studies have indicated that some units have a tendency to become unbalanced while cutting. The result, especially with carbide burs is an occasional "explosion" when the defective amalgam filling suddenly disintegrates. The disintegrating filling on rare occasions has sufficient force to actually fracture the tooth structure.

... information and photographs courtesy of

Jack L. Hartley, Director
Consultants International
San Antonio, Texas

A No. 35 dentist's carbide bur in an air bearing handpiece cutting amalgam filling at 290,000 rpm.

An unbalance in a chuck-bearing handpiece can on rare occasions cause the amalgam to suddenly disintegrate and cause tooth fracture. Single-flash photos were taken with a GR 1538 Strobotac and Nikon F camera with bellows extension. Lens used was a 55-mm Auto Micro Nikor reversed for best optical properties. Exposure was f/32 on Kodak Tri-X Pan.



Single-flash photo of fan blade clearly shows air current pattern.

"TOUCHLESS" TESTING

The air-moving equipment industry is one of the largest users of stroboscopes. Their products — fans and blowers — are such that a non-contacting testing method that provides both a means of measuring speed and observing motion is a must.

At Lau Blower Company, Dayton, Ohio, the Strobotac is used extensively throughout almost all design and test phases of fan development.

During propeller development, the relationship of the blades to the air medium is studied in order to maximize the efficiency of air movement. One of the methods used at Lau is to attach ends of fine threads, or telltales, in strategic locations on the blade's surface. When the rotation of the

fan is "stopped" by the light of the Strobotac, the thread pattern graphically reveals the air currents on the surface of the blade. Permanent records of the effects of various blade designs can be made easily by means of a photograph taken with the Strobotac as the light source.

In developing performance curves of fans and blowers, it is necessary to determine the rpm of the driving motor. Lau takes advantage of the no-contact, no-loading feature of the Strobotac to make speed measurements directly to an accuracy of 1% of reading.

Sound and vibration reduction also comes into play during prototype development of air-moving installations. Often, propeller blades will vibrate in sympathy with some other piece of equipment. When the blade is "stopped" with the light from the Strobotac, any axial fluctuations caused by vibration can be seen on each individual blade. If the number of fluctuations over a period of time are counted and this rate is related to the flashing frequency of the Strobotac, the actual offending vibrating frequency can be determined. This often pinpoints the area originating the vibration. Other parts in the assembly also can be scanned quickly with the Strobotac to determine if there are any other troublesome resonant areas. This technique is very useful for checking installations in the field. Often, just a Strobotac is all the test equipment needed to solve a knotty service problem.

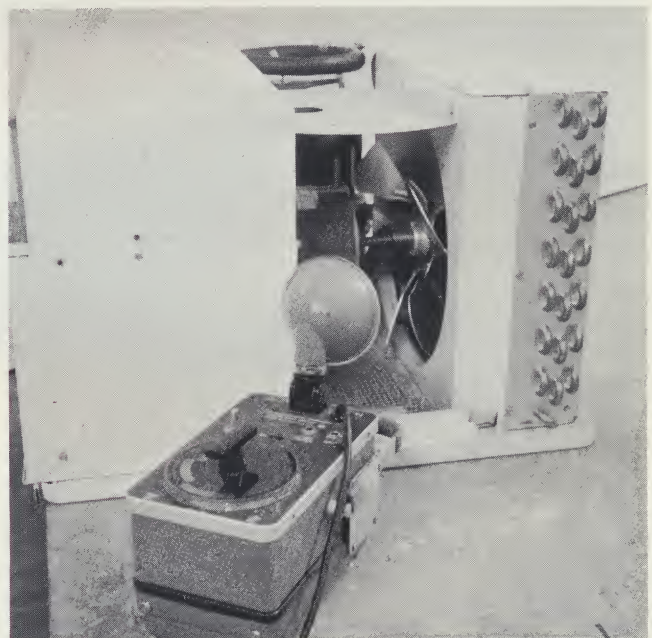
... information and photographs contributed by:

Donald D. Kinsworthy
Project Engineer
Lau Blower Company, Dayton, Ohio

REPRINTED
AND
AGAIN
AVAILABLE



The Stroboscope in the Textile Industry, a 34-page handbook describing strobe uses in spinning and weaving. Available free.



A typical prototype air moving installation on which sound and vibration reduction tests are conducted.

GENERAL RADIO

HYCAM KLINIC

Red Lake Laboratories, manufacturers of the Hycam Cameras, regularly conducts week-long seminars on high-speed motion picture photography. These programs are held throughout the year in various cities and will begin again in 1969. Among the many techniques presented the most interesting to us is the one using strobes with the Hycam Camera. For further information on Klinik dates and locations write: Red Lake Labs, Inc., 2971 Corvin Drive, Santa Clara, California 95051.

HOW PENN STATE "LOGS" A LIMB

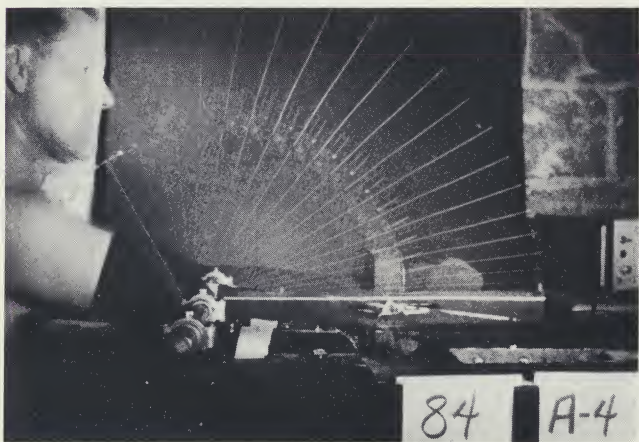
Helping to find out more about rapid human movements is a job for the Strobotac at Pennsylvania State University. The technique, developed by the staff of the Biomechanics Laboratory in the College of Health and Physical Education provides an accurate measurement of angular displacement, velocity, and acceleration of limb movements.

Two Strobotac® electronic stroboscopes and a 35mm camera record the data. The subject accelerates a darkened bar painted with a narrow white line. A black stocking on the subject's arm and a dark background help accent the stripe on the moving bar. The motion of the arm from beginning to end is photographed by multiple exposure techniques.

This setup has been successfully used in a number of experiments involving simple, rapid human movements. And, because the Strobotac is set at a known flashing rate it becomes in essence a very accurate time base. Hence, the identification of the exact location and behavior of the limb at any point in time can be determined easily.

... information and photograph courtesy of

Dr. Richard C. Nelson, Director
Biomechanics Laboratory,
Pennsylvania State University
University Park, Pennsylvania 16802



A HANDY HINT

The following technique is very useful when trying to determine the speed of a rotating shaft when the only possible view of the shaft is a lateral one. Usually it is not sufficient to put a single mark on the shaft and stop the motion with a stroboscope; the motion may be stopped at a flashing rate that is a multiple of the actual speed of rotation. Normally, if one were observing the end of the shaft a multiple image would be seen immediately, but it is difficult to distinguish a multiple image from a single image when one is looking at a shaft along its side.

To overcome this problem simply draw a band around the neck of the shaft but leave a small open gap. Then, draw a line in the gap at right angles to the band.



A



B

Sketch "A" will be seen only at the fundamental speed and at any subharmonics. At flashing rates higher than the fundamental a multiple image will show as a cross pattern formed by the two lines (sketch "B").

TECH FILMS SEMINAR

Tech Films of Waltham, Massachusetts, will begin a series of one-day seminars on Scientific and Engineering Applications of High-Speed Photography and Photoinstrumentation Techniques. The first Seminar will be held in Waltham on October 29, 1968. For further information phone 617-899-6664 or write Mr. William McCrea, Tech Films, 1484 Main Street, Waltham, Mass., 02154.

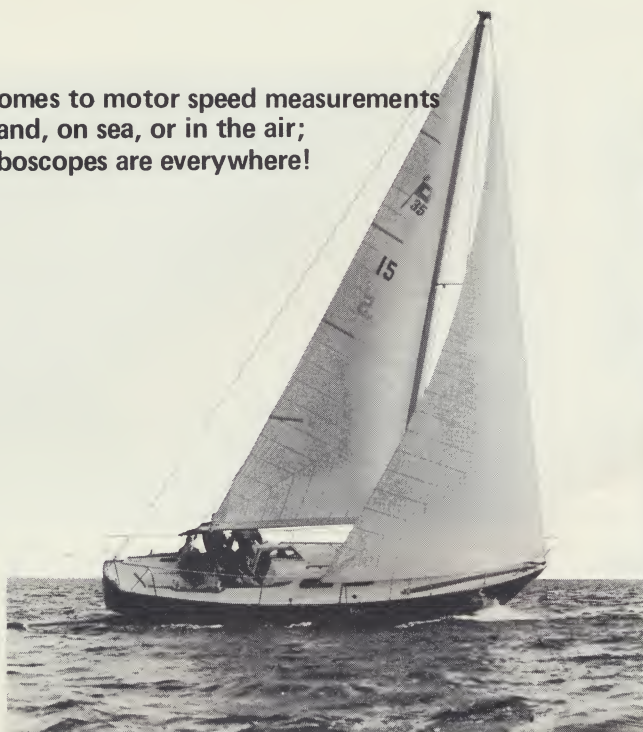
SEE STROBOTAC IN ACTION AT THESE SHOWS:

50th Materials Engineering Exposition and Congress, sponsored by the American Society for Metals, Cobo Hall, Detroit, October 14-17. Stop by Booth 917 and learn more about how stroboscopes can help you. Engineering personnel will be on hand to answer your questions.

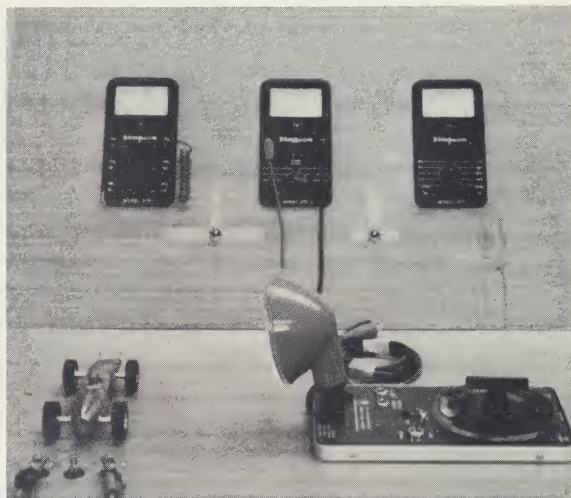
25th Southern Textile Expositions, Textile Hall, Greenville, South Carolina, October 21-25. Strobotac® electronic stroboscopes will be demonstrated by our representatives the Matthews Equipment Company, Booth 123.

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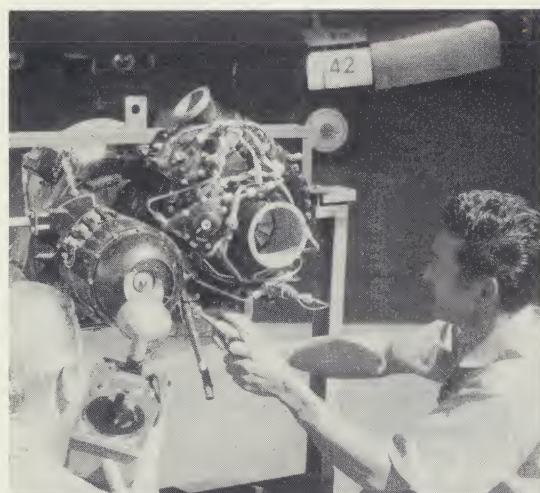
When it comes to motor speed measurements
on land, on sea, or in the air;
stroboscopes are everywhere!



... Pearson Yachts, a division of Grumman Allied Industries, Portsmouth, Rhode Island, checks out auxiliary engine performance and speed with a Strobotac ...



In the world of
model car racing,
K & B Manufacturing of
Downey, California,
"pit checks" their cars
with a Strobotac.



... Hawaiian Airlines uses a Strobotac to
set up the governing
speed of aircraft
gas turbines ...



and Hy-Dynamic Co., of Lake Bluff, Illinois,
uses a Strobotac to measure engine rpm during
final checkout procedures on hydraulic cranes ...

STROBOTACTICS

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